

WHAT IS CLAIMED IS

- 1 1. A method for verifying an electron treatment field created by an  
2 electron treatment beam, comprising:
  - 3 positioning an imaging device; and
  - 4 operating said imaging device to detect an image created by
  - 5 photons generated in the delivery of said electron treatment beam.
- 1 2. The method of claim 1, further comprising:
  - 2 enhancing said image to generate a representation of said electron
  - 3 treatment field.
- 1 3. The method of claim 1, wherein said imaging device is a flat panel  
2 imaging device.
- 1 4. The method of claim 1, wherein said imaging device is positioned  
2 downstream from a location to be irradiated by said electron treatment  
3 beam.
- 1 5. The method of claim 3, wherein said flat panel imaging device  
2 comprises a plurality of solid state sensors.
- 1 6. The method of claim 5, wherein said solid state sensors are  
2 amorphous silicon sensors.
- 1 7. The method of claim 1, wherein said imaging device comprises  
2 video technology.
- 1 8. The method of claim 1, wherein said enhancing further comprises:

2 determining an energy of said electron treatment beam;  
3 calculating an angular dependence of said photons on said electron  
4 treatment beam; and  
5 generating said representation of said electron treatment field based  
6 on said detected image and said angular dependence.

1 9. The method of claim 1, wherein said enhancing further comprises:  
2 comparing said image to an open field image to generate an  
3 enhanced image of said electron treatment field.

1 10. The method of claim 1, further comprising:  
2 displaying said representation of said electron treatment field on an  
3 operator display console.

1 11. The method of claim 1, further comprising:  
2 comparing said representation of said electron treatment field to a  
3 desired image of said electron treatment field.

1 12. The method of claim 8, further comprising:  
2 adjusting at least one of a collimator position and a patient position if  
3 said comparison indicates that said representation of said electron  
4 treatment field is different from said desired image of said electron  
5 treatment field.

1 13. A method for verifying a treatment field in a radiation therapy device,  
2 comprising:  
3 positioning an imaging device at a body to be irradiated;  
4 directing an electron beam at said body;  
5 collimating said electron beam to generate an electron treatment  
6 field; and

7           detecting, using said imaging device, an image created by a plurality  
8    of photons after passing through said body, said plurality of photons  
9    contained within said electron treatment field.

1    14.    The method of claim 13, further comprising:  
2           enhancing said image to generate a representation of said electron  
3    treatment field.

1    15.    The method of claim 13, wherein said plurality of photons are  
2    bremsstrahlung photons.

1    16.    The method of claim 14, further comprising:  
2           comparing said representation with a desired image of said electron  
3    treatment field; and  
4           repositioning at least one of said body and a collimator device if said  
5    comparing indicates that said representation is not within an expected  
6    tolerance of said desired image.

1    17.    The method of claim 14, wherein said enhancing further comprises:  
2           determining an energy of said electron treatment beam;  
3           calculating an angular dependence of said photons on said electron  
4    treatment beam; and  
5           generating said representation of said electron treatment field based  
6    on said detected image and said angular dependence.

1    18.    The method of claim 13, further comprising:  
2           positioning an imaging device beneath a treatment zone;  
3           directing an electron beam at said treatment zone;  
4           collimating said electron beam to generate an electron treatment  
5    field;  
6           detecting, using said imaging device, an open field image; and

7 comparing said open field image with said image to produce a  
8 representation of said electron treatment field.

- 1 19. A radiation treatment field verification method, comprising:
  - 2 generating a radiation treatment beam comprised of one of primary
  - 3 electrons and primary photons;
  - 4 selectively shaping said radiation treatment beam to create a
  - 5 radiation treatment field on a body;
  - 6 detecting components of said radiation treatment beam on an
  - 7 imaging device positioned downstream of said body; and
  - 8 generating a representation of said radiation treatment field.

1 20. The method of claim 19, wherein said radiation treatment beam  
2 comprises primary electrons and wherein said components of said  
3 radiation treatment beam are bremsstrahlung photons generated within  
4 said radiation treatment beam.

1 21. The method of claim 19, wherein said radiation treatment beam  
2 comprises primary photons and wherein said components of said radiation  
3 treatment beam are photons of said radiation treatment beam.

1 22. The method of claim 19, wherein said selectively shaping is  
2 performed by controllably positioning a photon collimator and an electron  
3 collimator.

- 1 23. The method of claim 20, wherein said generating a representation
- 2 further comprises:
  - 3 determining an energy of said primary electrons;
  - 4 calculating an angular dependence of said bremsstrahlung photons
  - 5 on said primary electrons; and

6 generating said representation of said radiation treatment field  
7 based on said detected components and said angular dependence.

1 24. The method of claim 20, wherein said generating a representation  
2 further comprises:

3 generating an open field representation of said radiation treatment  
4 field; and  
5 comparing said open field representation with said components  
6 detected downstream of said body to generate said representation of said  
7 radiation treatment field.

1 25. A radiation therapy device, comprising:  
2 an image detector positioned downstream from a body being  
3 irradiated by an electron beam and capturing a radiation image, said  
4 electron beam having a field shape at said body; and  
5 a computing device coupled to said image detector and operative to  
6 enhance said radiation image to generate a representation of said radiation  
7 image.

1 26. The radiation therapy device of claim 25, further comprising:  
2 a display device coupled to said computing device and displaying  
3 said representation of said radiation image.

1 27. The radiation therapy device of claim 25, further comprising:  
2 at least a first collimating device positioned along a path of said  
3 electron beam and controllably positioned to generate said field shape.

1 28. A system for verifying an electron treatment field, comprising:  
2 means for positioning an imaging device; and  
3 means for operating said imaging device to detect an image created  
4 by photons generated in the delivery of said electron treatment field.